

DENON

HI-FI STEREO
GRAPHIC EQUALIZER

SERVICE MANUAL MODEL DE-70 SOLID-STATE STEREO GRAPHIC EQUALIZER

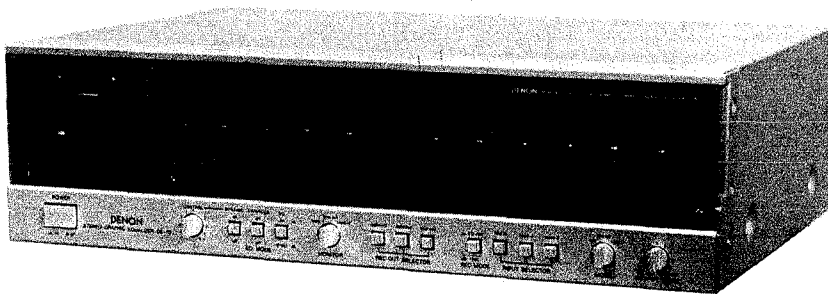


TABLE OF CONTENTS

SPECIFICATIONS	1
APPELLATIONS AND FUNCTION OF PARTS	1
CONNECTIONS	2
BLOCK DIAGRAM	3
REMOVAL EACH SECTIONS	4
FUNCTION SWITCHES LAYOUT	6
DISPLAY PANEL LAYOUT	6
SELECTOR SIGNAL ROUTE	6
SWITCH FUNCTION TABLE	7
SEMICONDUCTORS	8
METHOD OF ADJUSTMENTS	9
PRINTED WIRING BOARD PATTERNS AND PARTS LIST	
ETC0592B DISPLAY/P SPP. UNIT	10
ETC0591 EQUALIZER UNIT	11
ETC0593 VOLUME UNIT	12
CONNECTION DIAGRAM	13
WIRING DIAGRAM	14
EXPLODED VIEW OF CHASSIS AND CABINET	15

NIPPON COLUMBIA CO., LTD.

SPECIFICATIONS

Frequency response:	10 Hz to 200 kHz $+0$ -2.5 dB
Maximum output voltage:	8 V
Rated output voltage:	1 V
Total harmonic distortion rate:	0.003% or less, with the dynamic function and expander turned off (20 Hz ~ 20 kHz output 2 V)
Input sensitivity:	1 V
Dynamic range:	113 dB (1 kHz)
Input impedance:	40 kohm
Output impedance:	600 ohm
Gain:	0 dB ± 0.2 dB
Variable intensity:	± 12 dB (maximum)
Center frequencies:	16 Hz, 31.5 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz, 16 kHz, 32 kHz

Expander function:	With on/off function, level control and peak indicator
Dynamic function:	With on/off function, level control and peak indicator
Power source:	Germany and France AC 220 V, 50 Hz; U.K. AC 240 V, 50 Hz; U.S.A. AC 120 V, 60 Hz; 110 V/120 V/220 V/240 V, 50 Hz/60 Hz (Multiple)
Power consumption:	20 W
Dimensions:	432 W x 132H x 300 D (mm) (including rubber pads, knobs and terminals)
Weight:	6 kg

The specifications and contents are subject to alteration without notice.

NOTE: The following codes correspond to the appropriate models.

E3 for U.S.A., EC for Canada, E2 for Europe, E1 for Hong Kong & Singapore.

This Service Manual is prepared based on E2.

APPELLATIONS AND FUNCTION OF PARTS

Front Panel

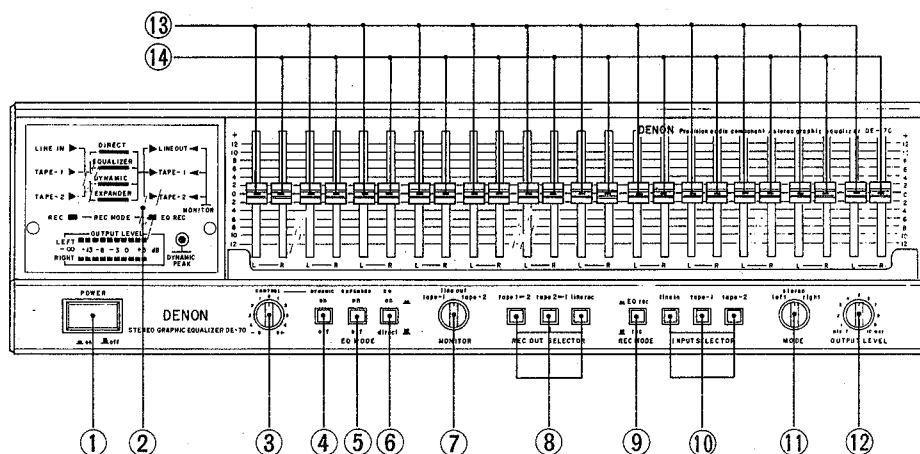
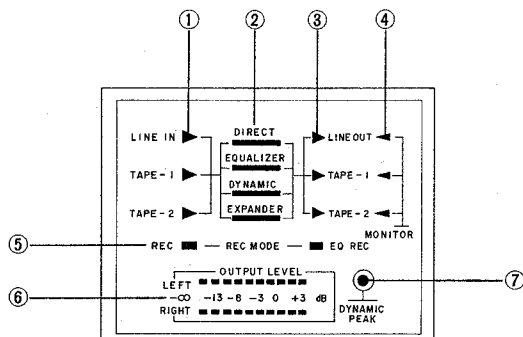


Fig. 1

- | | |
|---|--|
| ① POWER (Power Switch) | ⑧ RECOUT SELECTION (Recording Out Selector) |
| ② CENTRAL DISPLAY AREA | ⑨ REC MODE (Recording Mode) |
| ③ CONTROL (For Setting the Function Working Level of the Dynamic Sound Equalizer) | ⑩ INPUT (Input Selector) |
| ④ DYNAMIC (Dynamic Sound Equalizer Switch) | ⑪ MODE (Mode Switch) |
| ⑤ EXPANDER (Expander Switch) | ⑫ OUTPUT LEVEL (Output Level Control) |
| ⑥ EQ (Equalizer Direct Switch) | ⑬ GRAPHIC EQUALIZER SLIDE CONTROL KNOBS FOR L SIDE |
| ⑦ MONITOR (Tape Monitor Switch) | ⑭ GRAPHIC EQUALIZER SLIDE CONTROL KNOBS FOR R SIDE |

Details of DISPLAY



- | |
|-----------------------------------|
| ① INPUT SELECTOR position display |
| ② EQ MODE position display |
| ③ OUTPUT position display |
| ④ MONITOR position display |
| ⑤ REC MODE position display |
| ⑥ OUTPUT LEVEL display |
| ⑦ DYNAMIC PEAK display |

Fig. 2 -1-

CONNECTIONS

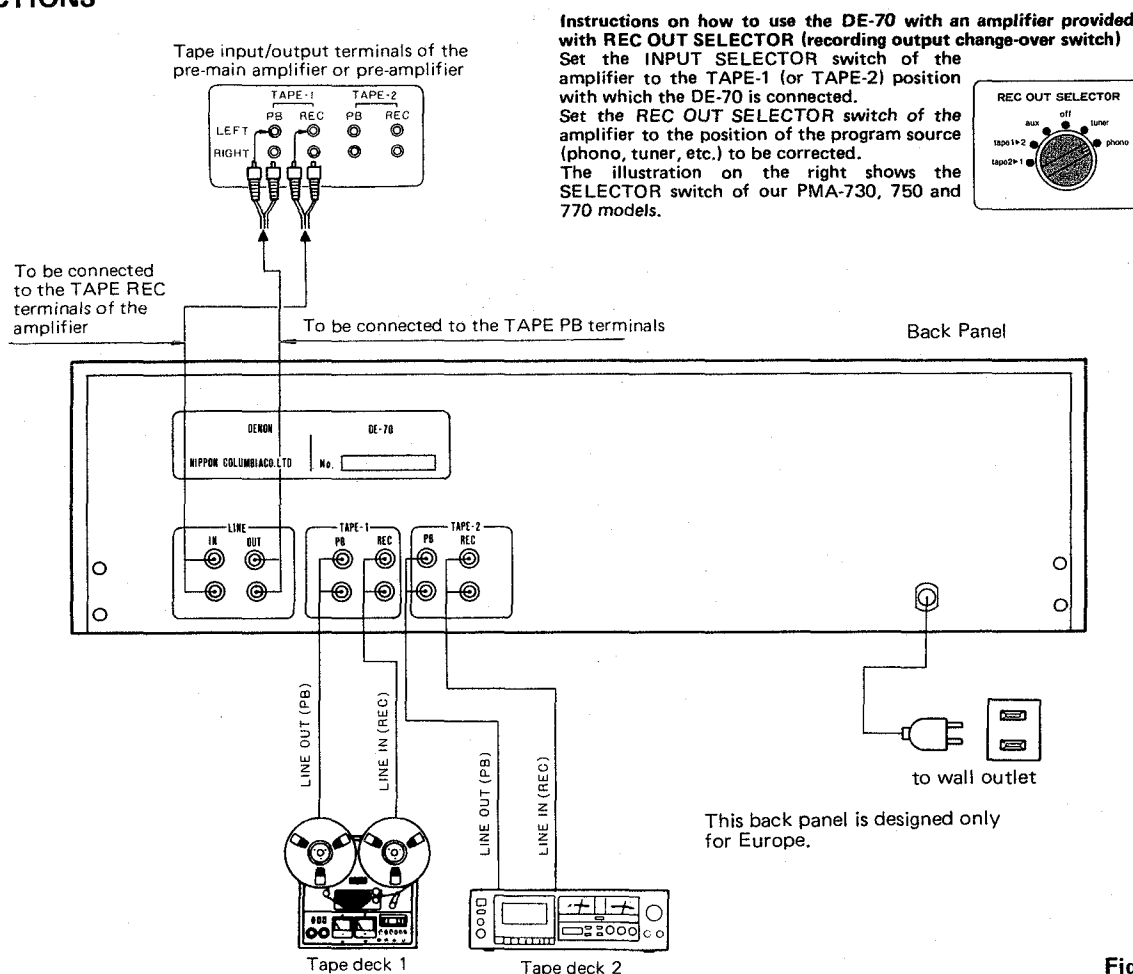


Fig. 3

CONNECT ACCORDING TO THE FOLLOWING SEQUENCE

- Stereo amplifier**
Volume control: Minimum
Tape switch: Monitor 1 or 2 (at 1, connect the connecting cord to TAPE-1 of the amplifier, and 2, to TAPE-2 of the amplifier.)
- DE-70 (this instrument)**
LINE IN terminals: To be connected to the REC terminals of the amplifier.
LINE OUT terminals: To be connected with the PB terminals of the amplifier.
TAPE-1, TAPE-2 terminals: Tape decks should be connected as shown in Fig. 1.

PRECAUTIONS FOR CONNECTIONS

- Before all the connections are completed, do not insert the power cord plug into the socket.
- After confirming the right and left channels, connect L with L and R with R.
- Firmly insert the plug. Any imperfect connection may cause noise.
- If a pin plug and power cord are bundled together or if a pin cord is placed near a power transformer, hum or noise may be caused.

Cautions for Use

- Displays**
 - Under the DIRECT condition with the EQ MODE switch, when the EXPANDER or DYNAMIC switch is depressed (to set to ON), the function is displayed (with red LED lit), but DIRECT has a priority, and the EXPANDER or DYNAMIC function is nullified.
 - DYNAMIC PEAK LED is not lit unless the EXPANDER or DYNAMIC switch is set to ON.
- DYNAMIC Effect**
 - DYNAMIC effect has little change in the level even if the EQ volume is raised in low or high frequency range, as limitation is applied to the control system to keep the effect from variation due to unnecessary noise.
- NOISE**
 - With the EXPANDER switch set to ON, if the DYNAMIC switch is set to ON or OFF immediately after the POWER switch is set to ON, click noise is appreciable. But, when the DYNAMIC switch is set to ON or OFF upon elapse of a certain time (about 30 seconds), the noise is reduced.

BLOCK DIAGRAM

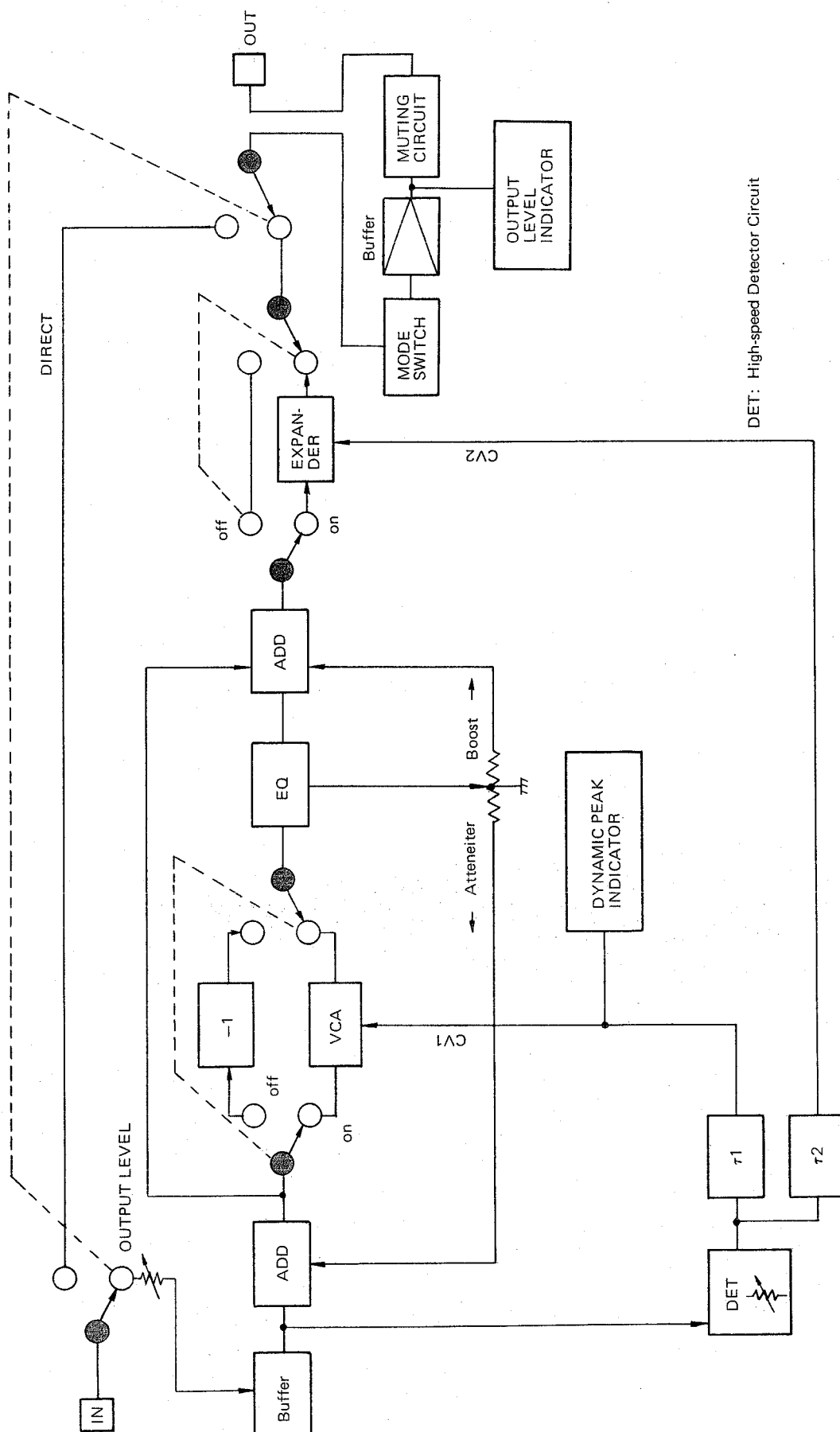


Fig. 4

REMOVAL EACH SECTIONS

1. How to Remove the Bottom Cover (Fig. 5)

- (1) Remove ten (10) screws fastened to the bottom cover. (Three screws on the front panel are 3x8 (galvanized), and the other seven are 3x6 (black).)

NOTE: 1. In fitting the bottom cover, be sure to use proper screws at proper locations.

If a 3x8 screw is used at any one of seven locations on the front panel side, its tip end may come into contact with the pattern of the ETC-591 unit.

2. Do not release the bottom foot fitting screws.
3. The bottom cover should be oriented properly. The side having vent holes should be positioned for the power transformer side.

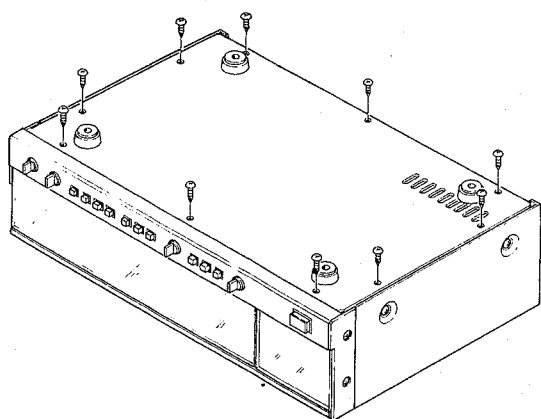


Fig. 5

2. How to Remove the Top Cover (Fig. 6)

- (1) Remove the four screws (two screws from the right-hand side, two screws from the left-hand side)
- (2) Lift the top cover upwards. This will release it.

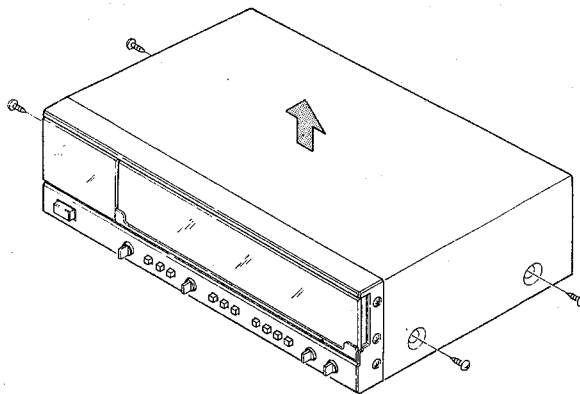


Fig. 6

3. How to Remove the Front Panel (Fig. 7)

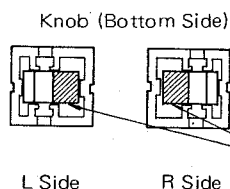
- (1) Remove the knobs of the slide volumes (total 24). See NOTE below for fitting.
- (2) Remove three screws at the upper part of the front panel.
- (3) Remove three screws at the lower part of the front panel.
- (4) Remove three screws on the right side of the front panel.
- (5) Remove two screws on the left side of the front panel.
- (6) Pull the front panel toward you to remove it.
- (7) Withdraw four round knobs (with care to keep them free from damage).

These round knobs may be withdrawn without removing the front panel. But, if they are fitted firmly, it is difficult to withdraw them. When the front panel is removed, they can be withdrawn readily. For fitting, insert them after the front panel has been fitted.

NOTE: 1. Caution for fitting of slide volumes.

The slide volume fitting knobs are all identical.

To fit them, take care as noted below.



Insert with the transparent part of broader width kept inside. If some of the knobs are inserted properly while the others not, knob spacing becomes irregular.

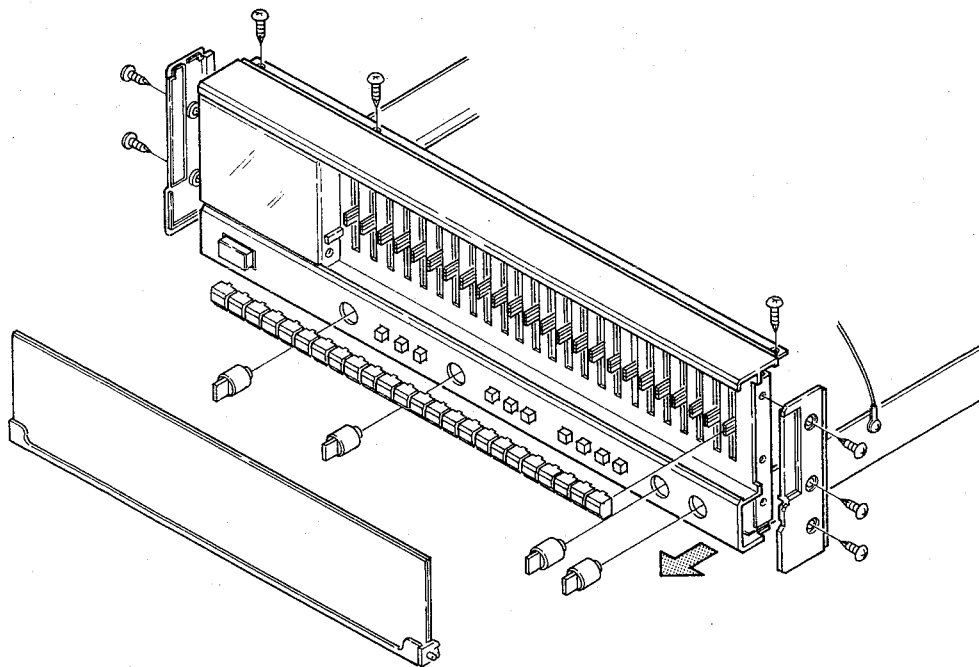


Fig. 7

4. How to Remove the Slide Volumes

- (1) The slide volumes are comprised of units ETC0593-4 for 16, 31.5, 63, 125, 250 and 500 Hz and ETC0593-3 for 1k, 2k, 4k, 8k, 16k and 32 kHz.
- (2) Remove twenty-four slide volume fitting screws (12 on the upper side and 12 on the lower side).
- (3) The slide volumes can be removed if the solder at six locations per volume is melted.
- (4) LED's are yellow colored for the L side and green colored for the R side.

NOTE: LED's are removable. In setting, take care of the polarity.

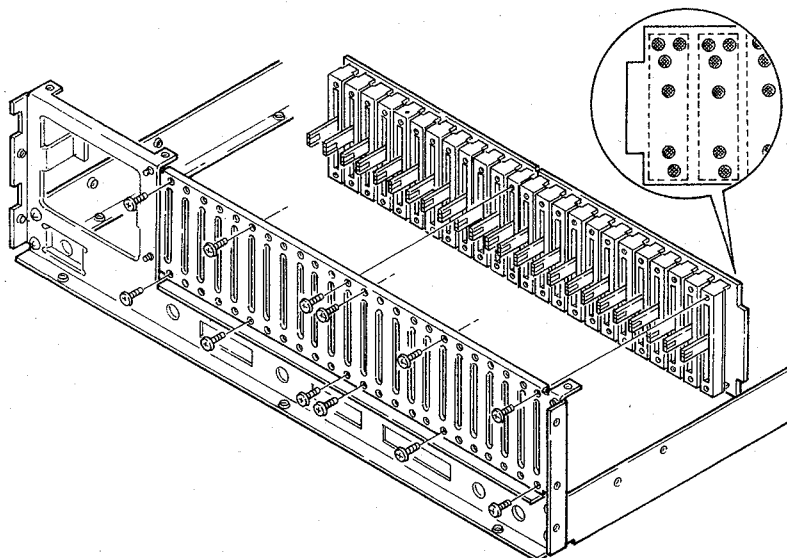
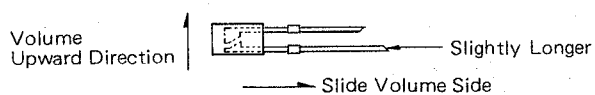


Fig. 8

FUNCTION SWITCHES LAYOUT

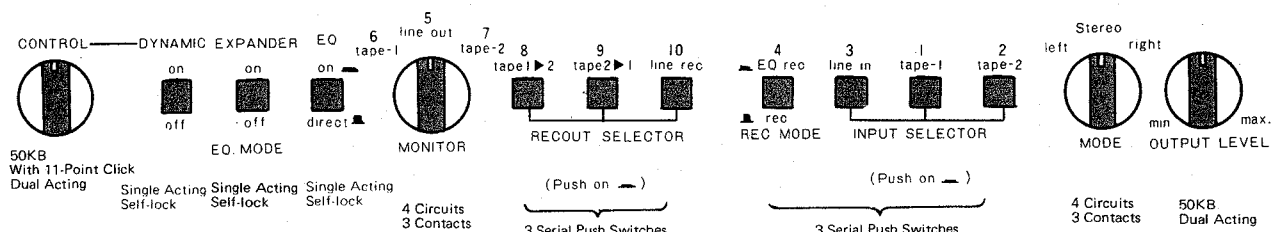


Fig. 9

DISPLAY PANEL LAYOUT

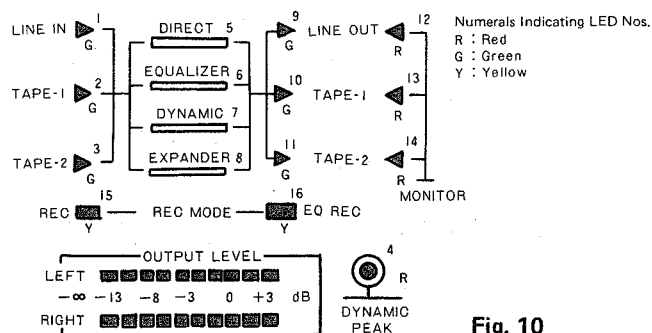


Fig. 10

SELECTOR SIGNAL ROUTE

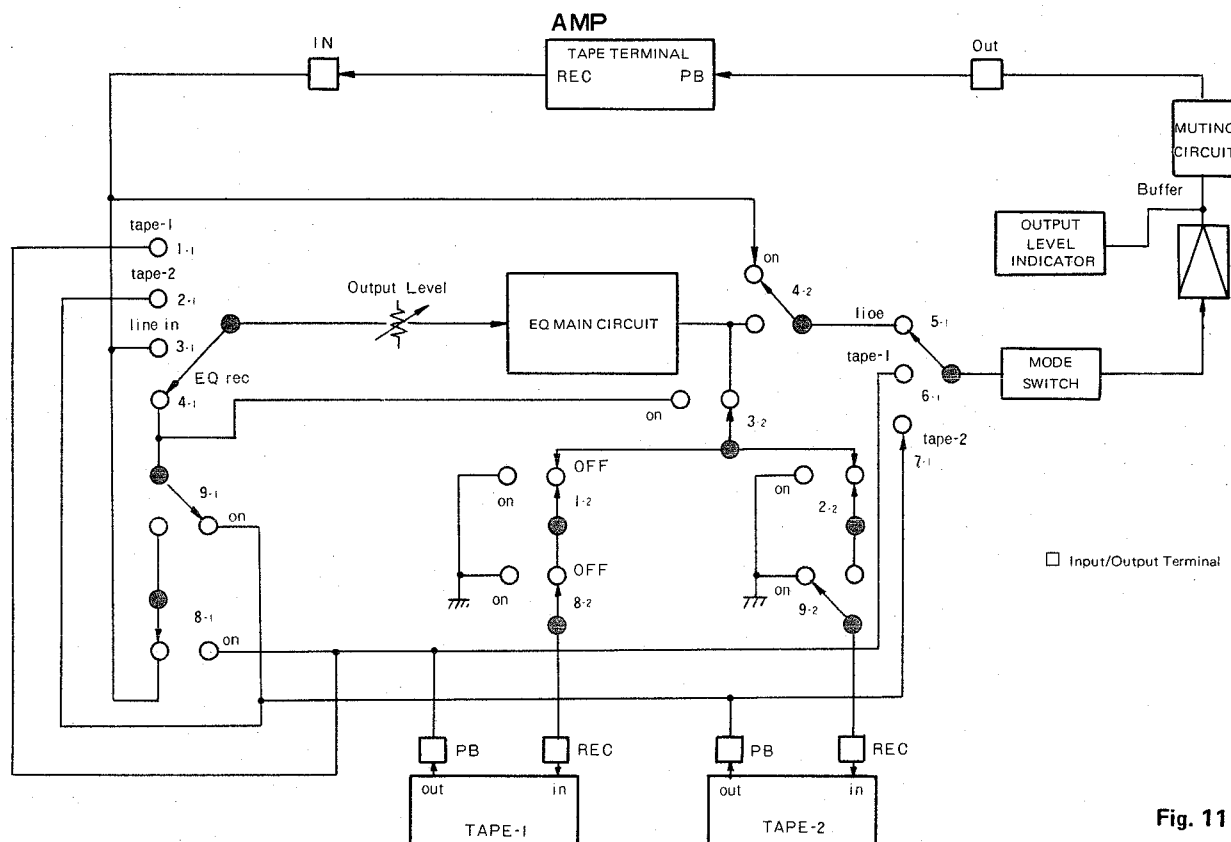


Fig. 11

SW1 ~ SW4 → INPUT SELECTOR (4 Serial, Push)

SW5 ~ SW7 → MONITOR Switch (Rotary)

SW8 ~ SW10 → RECOUT SELECT (3 Serial, Push)

* EQ SELECTOR switches are included in EQ Main Circuit

* Branched numbers at switches indicating acting mode.

Current Switch Positions

INPUT SELECT → EQ rec Position (4-1).

At this time, (4-2) Switch set to ON.

RECOUT SELECT → 21 (9-1).

At this time, (9-2) Switch set to ON.

MONITOR → Line out

SWITCH FUNCTION TABLE

INPUT SELECT	SWITCH NO.	MONITOR	SWITCH NO.	RECOUT SELECT	SWITCH NO.
Tape-1	1	Line out	5	1 ▶ 2	8
Tape-2	2	Tape-1	6	2 ▶ 1	9
Line in	3	Tape-2	7	Line rec	10
EQ rec Position	4				

* LED's lit on Display Panel indicate the route of sound at the output terminal.

	ON Switches	Lit LED Nos.	Signal Route (Output Route)	Remarks
A	1 5 8	2 (5,6,7,8) 9,12	Tape-1 ▶ EQ. ▶ line	Tape-1 output produced through EQ. At this time, tape-1 ▶ EQ ▶ tape-2 enabled.
	9	2 (5,6,7,8) 9,12	Tape-1 ▶ EQ. ▶ line	Tape-1 output produced through EQ. At this time, recording not enabled.
	10	2 (5,6,7,8) 9,12	Tape-1 ▶ EQ. ▶ line	Tape-1 output produced through EQ. At this time, tape-1 ▶ EQ ▶ tape-2 enabled.
B	1 6 8	13	Tape-1	Tape-1 output produced directly. Tape-1 ▶ EQ ▶ tape-2 enabled.
	9	13	Tape-1	Tape-1 output produced directly. Recording not enabled.
	10	13	Tape-1	Tape-1 output produced directly. Tape-1 ▶ EQ ▶ tape-2 enabled.
C	1 7 8	14	Tape-2	Tape-2 output produced directly. Tape-1 ▶ EQ ▶ tape-2 enabled.
	9	14	Tape-2	Tape-2 output produced directly. Recording not enabled.
	10	14	Tape-2	Tape-2 output produced directly. Tape-1 ▶ EQ ▶ tape-2 enabled.

* (5,6,7,8) are LED's interconnected with EQ SELECT and included in EQ Main Circuit, meaning LED's (5,6,7,8) are chosen by the switches in the circuit.

D	2 5 8	3 (5,6,7,8) 9,12	Tape-2 ▶ EQ. ▶ line	Tape-2 output produced through EQ. Recording enabled.
	9	3 (5,6,7,8) 9,12	Tape-2 ▶ EQ. ▶ line	Tape-2 output produced through EQ. Tape-2 ▶ EQ ▶ tape-1 enabled.
	10	3 (5,6,7,8) 9,12	Tape-2 ▶ EQ. ▶ line	Tape-2 output produced through EQ. Tape-2 ▶ EQ ▶ tape-1 enabled.
E	2 6 8	13	Tape-1	Tape-1 output produced directly. Recording not enabled.
	9	13	Tape-1	Tape-1 output produced directly. Tape-2 ▶ EQ ▶ tape-1 enabled.
	10	13	Tape-1	Tape-1 output produced directly. Tape-2 ▶ EQ ▶ tape-1 enabled.
F	2 7 8	14	Tape-2	Tape-2 output produced directly. Recording not enabled.
	9	14	Tape-2	Tape-2 output produced directly. Tape-2 ▶ EQ ▶ tape-1 enabled.
	10	14	Tape-2	Tape-2 output produced directly. Tape-2 ▶ EQ ▶ tape-1 enabled.
G	3 5 8	1 (5,6,7,8) 9,12,15	Line ▶ EQ. ▶ line	Line output (for recording, etc.) produced through EQ. Tape-1 ▶ tape-2 reverse side dubbing enabled.
	9	1 (5,6,7,8) 9,12,15	Line ▶ EQ. ▶ line	Line output (for recording, etc.) produced through EQ. Tape-1 ▶ tape-2 reverse side dubbing enabled.
	10	1 (5,6,7,8) 9,12,15	Line ▶ EQ. ▶ line	Line output (for recording, etc.) produced through EQ. Line ▶ tape-1, tape-2 simultaneous recording enabled.
H	3 6 8	13,15	Tape-1 (source)	Tape-1 output produced directly. Tape-1 ▶ tape-2 enabled.
	9	13,15	Tape-1 (monitor)	Tape-1 output produced directly. Tape-2 ▶ tape-1 enabled.
	3 7 10	13,15	Tape-1 (monitor)	Tape-1 output produced directly. Line ▶ tape-1, tape-2 simultaneous recording enabled.
I	3 7 8	14,15	Tape-2 (monitor)	Tape-2 output produced directly. Tape-1 ▶ tape-2 enabled.
	9	14,15	Tape-2 (source)	Tape-2 output produced directly. Tape-2 ▶ tape-1 enabled.
	10	14,15	Tape-2 (monitor)	Tape-2 output produced directly. Line ▶ tape-1, tape-2 simultaneous recording enabled.

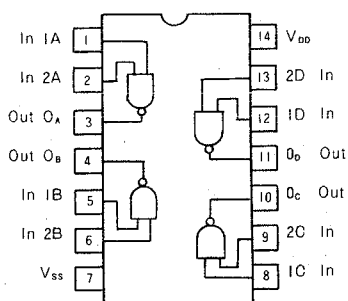
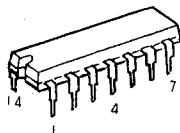
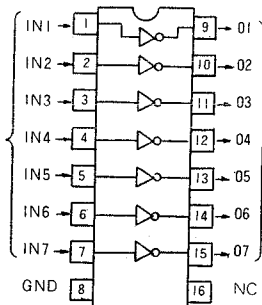
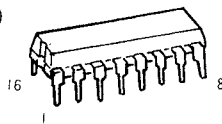
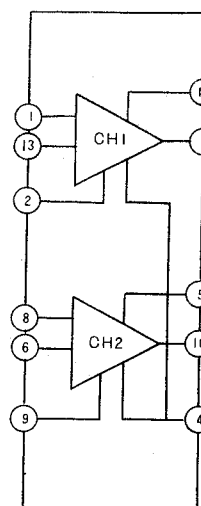
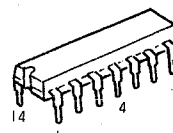
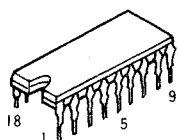
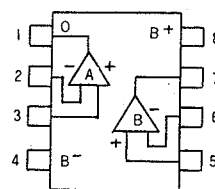
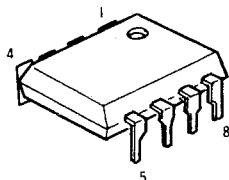
* G, H and I positions — EQ in the main signal system (recording, etc.) and not in the recording system (normal dubbing position).

J	4 5 8	12,16	Line	Line signal produced directly. Tape-1 ▶ EQ ▶ tape-2 EQ reverse side dubbing enabled.
	9	12,16	Line	Line signal produced directly. Tape-2 ▶ EQ ▶ tape-1 EQ reverse side dubbing enabled.
	10	12,16	Line	Line signal produced directly. Line ▶ EQ ▶ tape-1, tape-2 simultaneous recording enabled.
K	4 6 8	2 (5,6,7,8) 11,13,16	Tape-1 (source)	Tape-1 output produced directly. Tape-1 ▶ EQ ▶ tape-2 EQ reverse side dubbing enabled.
	9	3 (5,6,7,8) 10,13,16	Tape-1 (monitor)	Tape-1 output produced directly. Tape-2 ▶ EQ ▶ tape-1 EQ reverse side dubbing enabled.
	10	1 (5,6,7,8) 10,11,13,16	Tape-1 (monitor)	Tape-1 output produced directly. Line ▶ EQ ▶ tape-1, tape-2 EQ simultaneous recording enabled.
L	4 7 8	2 (5,6,7,8) 11,14,16	Tape-2 (monitor)	Tape-2 output produced directly. Tape-1 ▶ EQ ▶ tape-2 EQ reverse side dubbing enabled.
	9	3 (5,6,7,8) 10,13,16	Tape-2 (source)	Tape-2 output produced directly. Tape-2 ▶ EQ ▶ tape-1 EQ reverse side dubbing enabled.
	10	1 (5,6,7,8) 10,11,14,16	Tape-2 (monitor)	Tape-2 output produced directly. Line ▶ EQ ▶ tape-1, tape-2 simultaneous recording enabled.

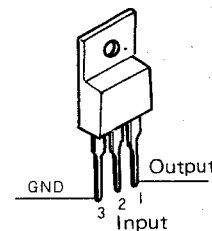
* J, K and L positions — Designed exclusively for equalizer dubbing with EQ set in the recording system (equalizer dubbing position).

SEMICONDUCTORS

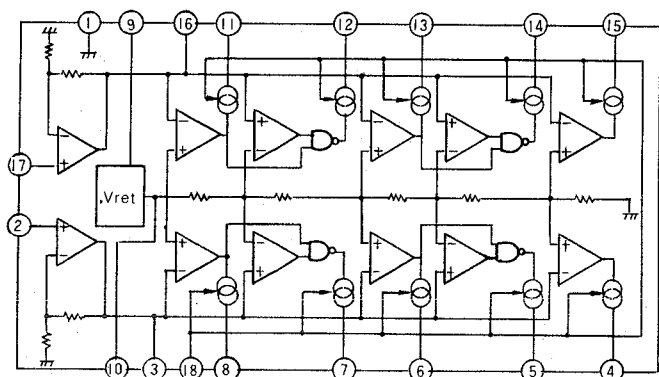
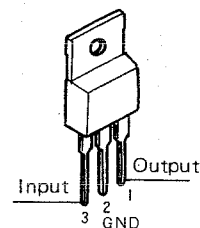
• IC

HD14011BP
(Hitachi)M54519P
(Mitsubishi)AN829
(Matsushita)AN6888
(Matsushita)NJM4560D (JRC)
NJM4558D-D (JRC)

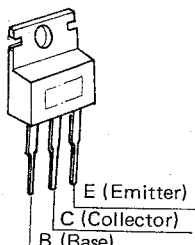
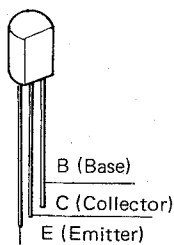
NJM79M15A(JRC)



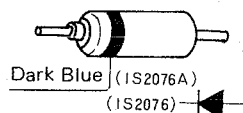
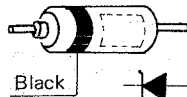
NJM78M15A(JRC)



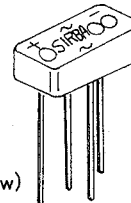
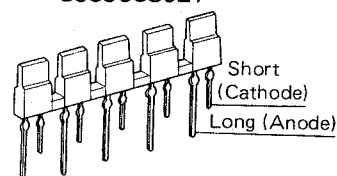
• Transistors

2SC1815(Y),(BL) 2SC1626(Y)
2SA999(F/G)

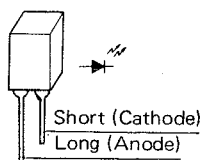
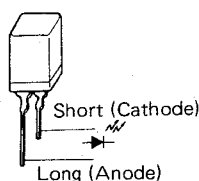
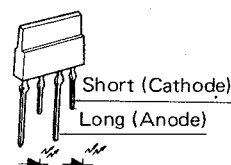
• Diodes (Including Zener Diode and LED)

1S2076A
1S2076HZ5C-1
HZ-15-2

SIRBA10F

5 Serial LEDs (Green)
3939038027

PG5533KY(Green)

GL-9PR4(Red)
GL-9HY4(Yellow)SLP171E(Red)
SLP271E(Green)
SLP471E(Yellow)

METHOD OF ADJUSTMENTS

1. Adjustment of Peak Level Meter

- Set the switches to the positions below.

INPUT SELECTOR : Line in
 MODE : Stereo
 OUTPUT LEVEL : Max.
 MONITOR : Line out
 EQ. MODE : DIRECT

- (1) Line in a sine wave of 1 kHz 0 dBm to both channels, and adjust VR1 and VR2 on ETC-592 unit so that LED's are lit up to the fourth from the left. (VR1 ... Lch, VR2 ... Rch)
- (2) After adjustment of (1) above, line in a sine wave of 1 kHz 10 dBm to both channels, and see only the left end LED (-13 dB) is lit, then lit in 0 dB, and confirm that four LED's are lit.

2. Adjustment of Expander Circuit

- Set the switches to the positions below.

OUTPUT LEVEL : Max.
 MODE : Stereo
 INPUT SELECTOR : Line in
 RECOUT SELECTOR : Line rec.
 MONITOR : Line out
 EQ. MODE : EQ. on
 EXPANDER : ON
 DYNAMIC : OFF

- (1) Position the dynamic control volume at the center.
- (2) The line in signal is a 1 kHz sine wave to both channels.
- (3) Adjust VR1 on ETC-591-1 unit so that with line-in of -30 dBm, the line-out is -30 dBm \pm 1 dB.
- (4) Line in 0 dBm to both channels, and confirm that the line-out is
 +12 dBm \pm 3 dB with EXPANDER set to ON, or
 0 dBm \pm 1 dB with EXPANDER set to OFF.
 NOTE: EQ volume should all be flat.

3. Adjustment of Dynamic Peak LED Lighting Level

- Set the switches to the positions below.

OUTPUT LEVEL : Max.
 MODE : Stereo
 INPUT SELECTOR : Line in
 RECOUT SELECTOR : Line rec
 MONITOR : Line out
 EQ. MODE : EQ. on
 EXPANDER : OFF
 DYNAMIC : ON

- (1) Line-in is a 1 kHz sine wave to both channels.
- (2) Adjust VR3 on ETC-591-1 unit so that with line-in of 0 dBm to both channels, the LED is turned on with the dynamic control volume at a position of (center +1) or turned off at a position of (center).

SCHEMATIC DIAGRAM OF ADJUSTING LOCATIONS

ETC0592B-2 DISPLAY/P SPP UNIT

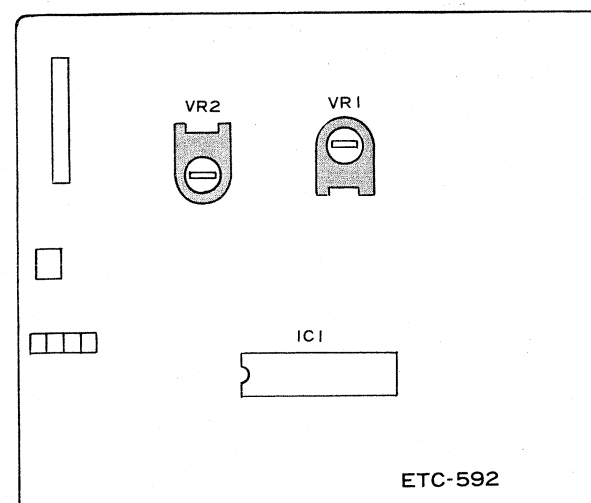


Fig. 12

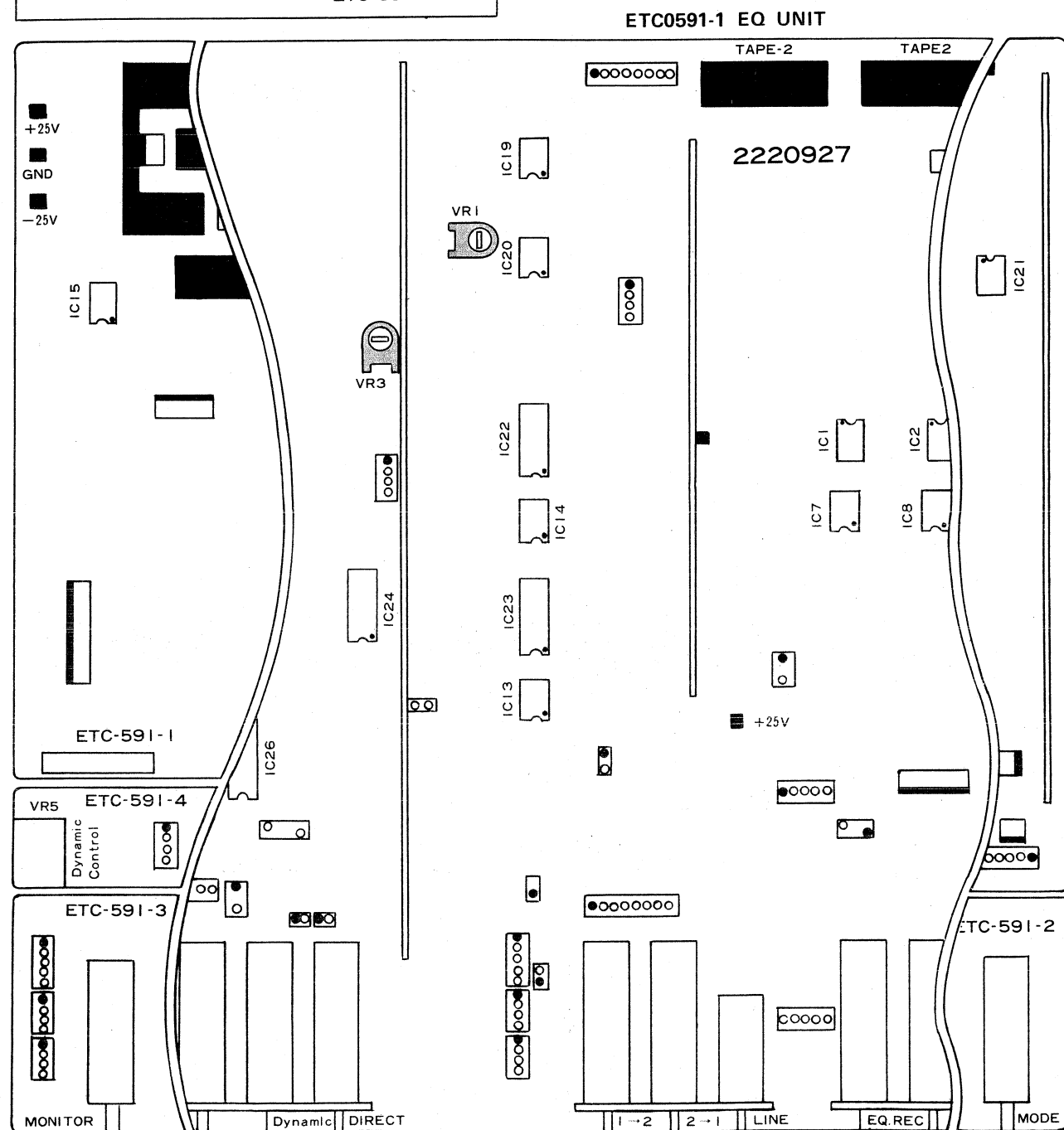
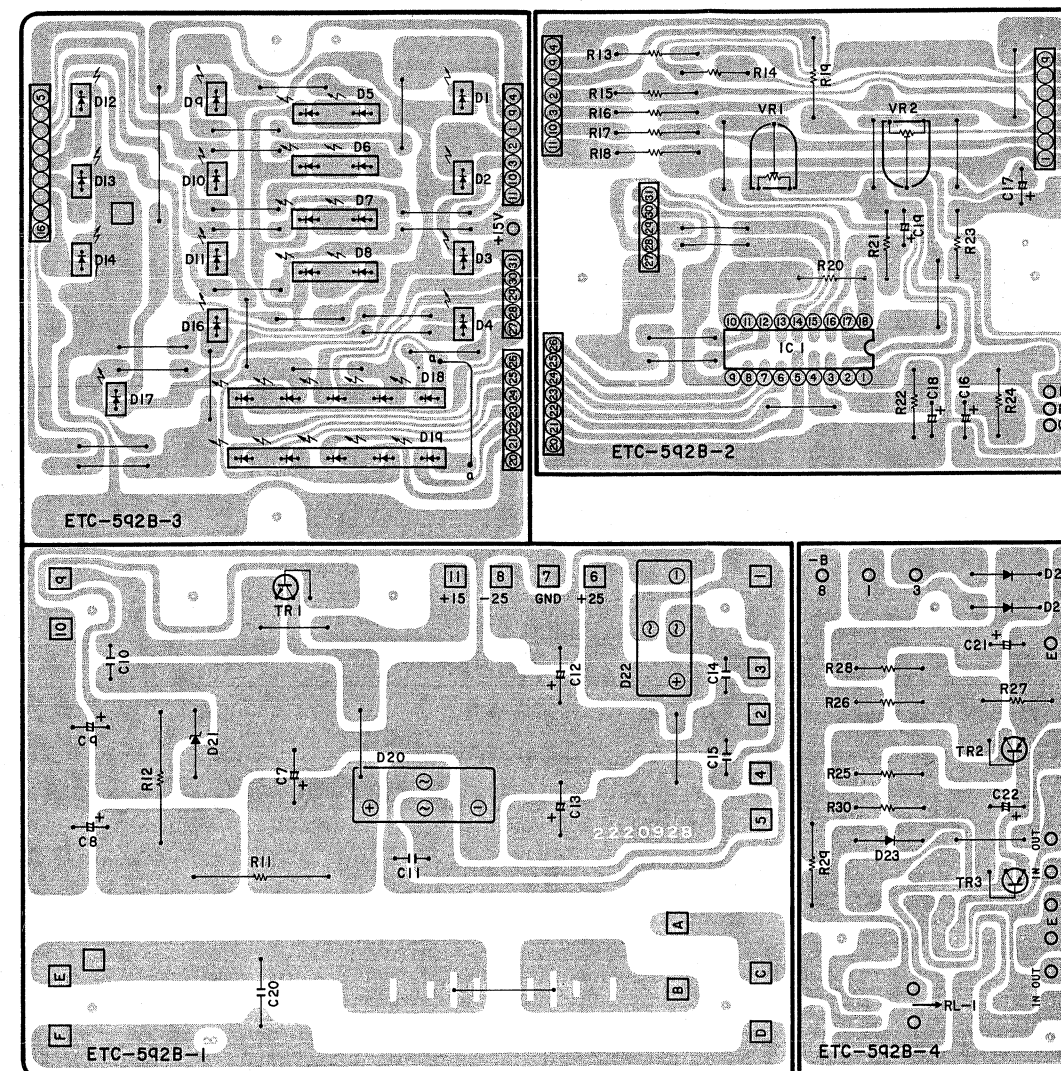


Fig. 13

PRINTED WIRING BOARD PATTERNS AND PARTS LIST
ETC0592B DISPLAY/P SPP. UNIT

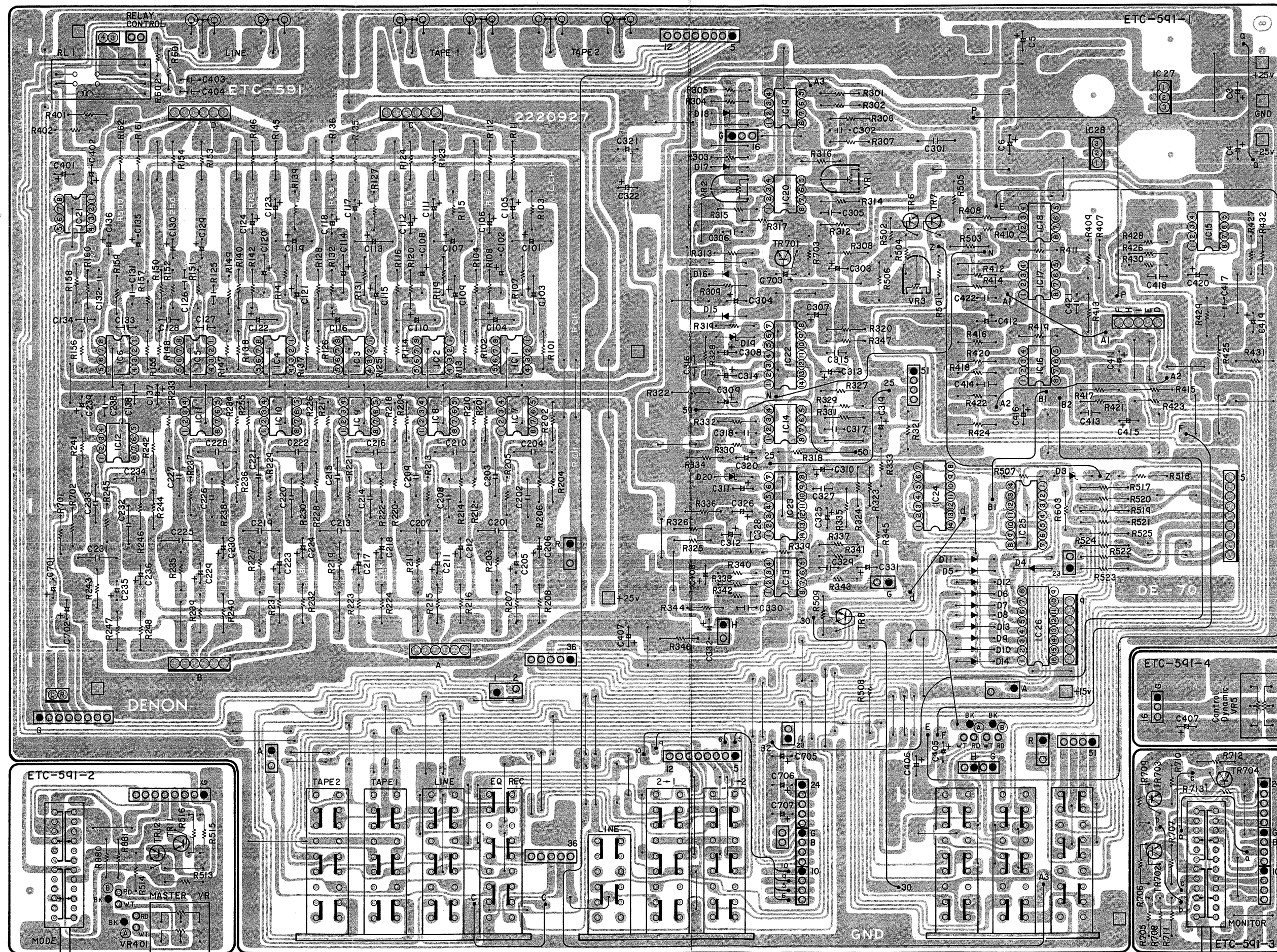


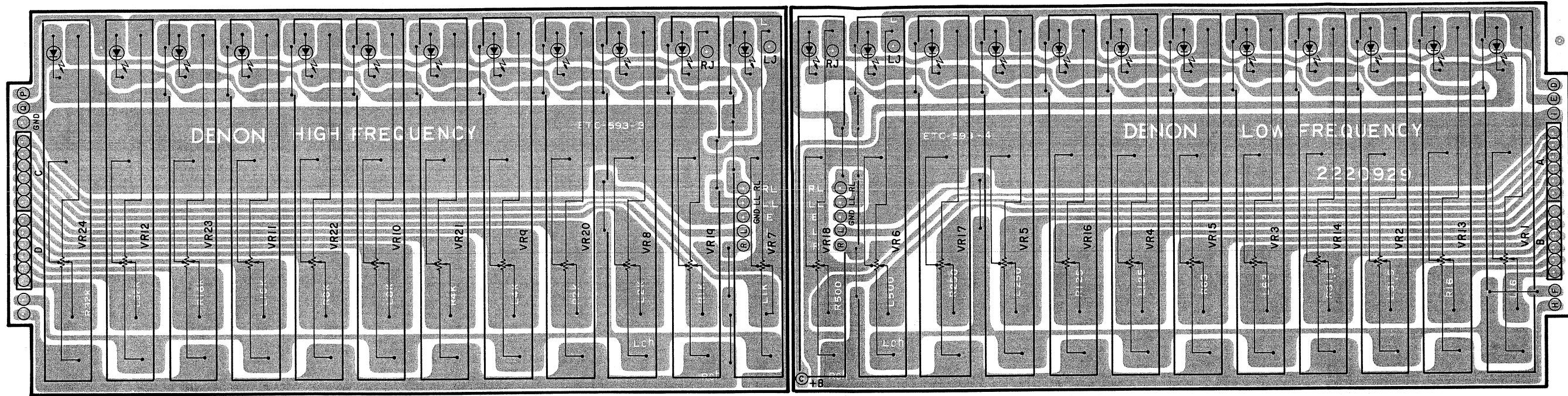
ETC0592B DISPLAY/P SPP. UNIT PARTS LIST

Ref. No.	Part No.	Part Name & Descriptions			
SEMICONDUCTORS					
IC01	2630256002	AN6888 (MATSUSHITA)	IC		
TR01	2730177007	2SC1626(Y)	TRANSISTOR		
TR02 ~03	2710113036	2SA999(F)/(G)	TRANSISTOR		
D01 ~03	3939188003	PG5533KY (GREEN)	LED		
D05	3939155023	SLP-271E (GREEN)	LED		
D06	3939155036	SLP-471E (YELLOW)	LED		
D07 ~08	3939155007	SLP-171E (RED)	LED		
D09 ~11	3939188003	PG5533KY (GREEN)	LED		
D12 ~14	3939147015	GL-9PR4 (RED)	LED		
D15 ~16	3939147028	GL-9HY4 (YELLOW)	LED		
D17	3939147015	GL-9PR4 (RED)	LED		
D18 ~19	393903827	5 GANG LED (GREEN)	LED		
D20	2760194018	SIRBA10F	DIODE		
D21	2760253001	HZ15-2	ZENER		
D22	2760194018	SIRBA10F	DIODE		
D23	2760049008	1S2076	DIODE		
D24 ~25	2760049011	1S2076A	DIODE		
RESISTORS (not included Carbon Film ±5% ¼W Type)					
VR01 ~02	211601638	SEMI FIXED RESISTOR 10 k ohm			

Ref. No.	Part No.	Part Name & Descriptions			
R29	2410183007	820 ohm ±5%	½W	CARBON FILM	
CAPACITORS (not included Ceramic ±5%, 50V Type)					
C07	2544159017	1000µF	35V	ELECTROLYTIC	
C08 ~09	2544138009	47µF	35V	ELECTROLYTIC	
C10 ~11	2531024003	0.01µF	+80% -20%	50V	CERAMIC
C12	2544159017	100µF	35V	ELECTROLYTIC	
C13	2544065017	2200µF	35V	ELECTROLYTIC	
C14 ~15	2531024003	0.01µF	+80% -20%	50V	CERAMIC
C16 ~19	2544140000	4.7µF	35V	ELECTROLYTIC	
C20		0.01µF	± 20%	400V	CERAMIC
C21	2544060038	0.47µF	100V	ELECTROLYTIC	
C22	2544161047	470µF	±20%	6.3V	ELECTROLYTIC
OTHER PARTS					
	2220928106	P.W. BOARD			
	2090047903	0.6 JUMPER WIRE		USED 32	
	2050134908	TERMINAL PIN		USED 19	
	2090008162	JUMPER		USED 1	
	2090008104	JUMPER		USED 1	
	4170204017				
	4410391004	LED HOLDER			
	4770115001	PUSH RIVET		USED 2	
	2032108020	2P CONNECTOR CORD			
	2042050029	7P CONNECTOR CORD			
	2042056007	9P CONNECTOR CORD			
	4730454016	TAPPING SCREW (2) 4x8			

ETC0591 EQUALIZER UNIT





ETC0591 EUQALIZER UNIT PARTS LIST

Ref. No.	Part No.	Part Name & Descriptions			
SEMICONDUCTORS					
IC01 ~15	2650030004	NJM4558D-D (JRC)		IC	
IC16 ~18	2630118001	NJM4560D (JRC)		IC	
IC19 ~20	2650030004	NJM4558D-D (JRC)		IC	
IC21	2630118001	NJM4560D (JRC)		IC	
IC22 ~23	2630255003	AN-829 (MATSUSHITA)		IC	
IC24 ~25	2620300007	HD14011BP (HITACHI)		IC	
IC26	2620348001	M54519P (MITSUBISHI)		IC	
IC27	2680217004	NJM-78M15A (JRC)		IC	
IC28	2630259009	NJM-79M15A (JRC)		IC	
TR06 ~07	2730198015	2SC1815(BL)		TRANSISTOR	
TR08	2730198002	2SC1815(Y)		TRANSISTOR	
TR11 ~12	2730198015	2SC1815(BL)		TRANSISTOR	
TR701 ~704	2730198015	2SC1815(BL)		TRANSISTOR	
D05 ~14	2760049008	1S2076		DIODE	
D17 ~18	2760049008	1S2076		DIODE	
D19 ~20	2760236031	HZ5C-1		ZENER	
RESISTORS (not included ±5%, ¼W Carbon Film Type)					
VR01	2116000099	SEMI FIXED RESISTOR		2 k ohm	
VR03	2116016038	SEMI FIXED RESISTOR		10 k ohm	
VR04	2110369008	VARIABLE RESISTOR (OUT LEVEL)		50 k ohm	
VR05	2110370000	VARIABLE RESISTOR (DYNAMIC)		50 k ohm	
R508	2440090018	220 ohm	±5%	2W	METAL OXIDE
R517 ~518	2410183007	820 ohm	±5%	½W	CARBON FILM
R524 ~525	2410183007	820 ohm	±5%	½W	CARBON FILM
CAPACITORS (not included ±5%, 50V Ceramic Type)					
C03 ~04	2549014021	0.33µF	±20%	50V	ELECTROLYTIC
C05 ~06	2544146004	1µF		50V	ELECTROLYTIC
C101 ~104	2549011008	1µF		50V	ELECTROLYTIC
C105 ~106	2544130007	100µF		10V	ELECTROLYTIC

Ref. No.	Part No.	Part Name & Descriptions			
C107 ~110	2549011008	1µF		50V	ELECTROLYTIC
C111 ~112	2544129005	47µF		10V	ELECTROLYTIC
C113 ~116	2549011008	1µF		50V	ELECTROLYTIC
C117 ~118	2544133004	22µF		10V	ELECTROLYTIC
C119 ~122	2549011008	1µF		50V	ELECTROLYTIC
C123 ~124	2544132005	10µF		16V	ELECTROLYTIC
C125 ~128	2551121070	0.027µF	±5%	50V	PLASTIC FILM
C129 ~130	2544132005	10µF		16V	ELECTROLYTIC
C131 ~134	2551121067	0.022µF	±5%	50V	PLASTIC FILM
C135 ~136	2544132005	10µF		16V	ELECTROLYTIC
C137	2544146004	1µF	+80%	50V	ELECTROLYTIC
C138	2531024003	0.01µF	-20%	50V	CERAMIC
C201 ~204	2551120042	0.0022µF	±5%	50V	PLASTIC FILM
C205 ~206	2544132005	10µF		16V	ELECTROLYTIC
C207 ~210	2551120042	0.0022µF	±5%	50V	PLASTIC FILM
C211 ~212	2544132005	10µF		16V	ELECTROLYTIC
C213 ~216	2551120084	0.0047µF	±5%	50V	PLASTIC FILM
C217 ~218	2544132005	10µF		16V	ELECTROLYTIC
C219 ~222	2551120042	0.0022µF	±5%	50V	PLASTIC FILM
C223 ~224	2544132005	10µF		16V	ELECTROLYTIC
C225 ~228	2551120042	0.0022µF	±5%	50V	PLASTIC FILM
C229 ~230	2544132005	10µF		16V	ELECTROLYTIC
C235 ~236	2544132005	10µF	+80%	16V	ELECTROLYTIC
C238	2531024003	0.01µF	-20%	50V	CERAMIC
C239	2544146004	1µF		50V	ELECTROLYTIC
C301	2551122011	0.056µF	±5%	50V	PLASTIC FILM
C304	2544131006	220µF		10V	ELECTROLYTIC
C307 ~314	2544146004	1µF		50V	ELECTROLYTIC
C319 ~320	2544130007	100µF		10V	ELECTROLYTIC

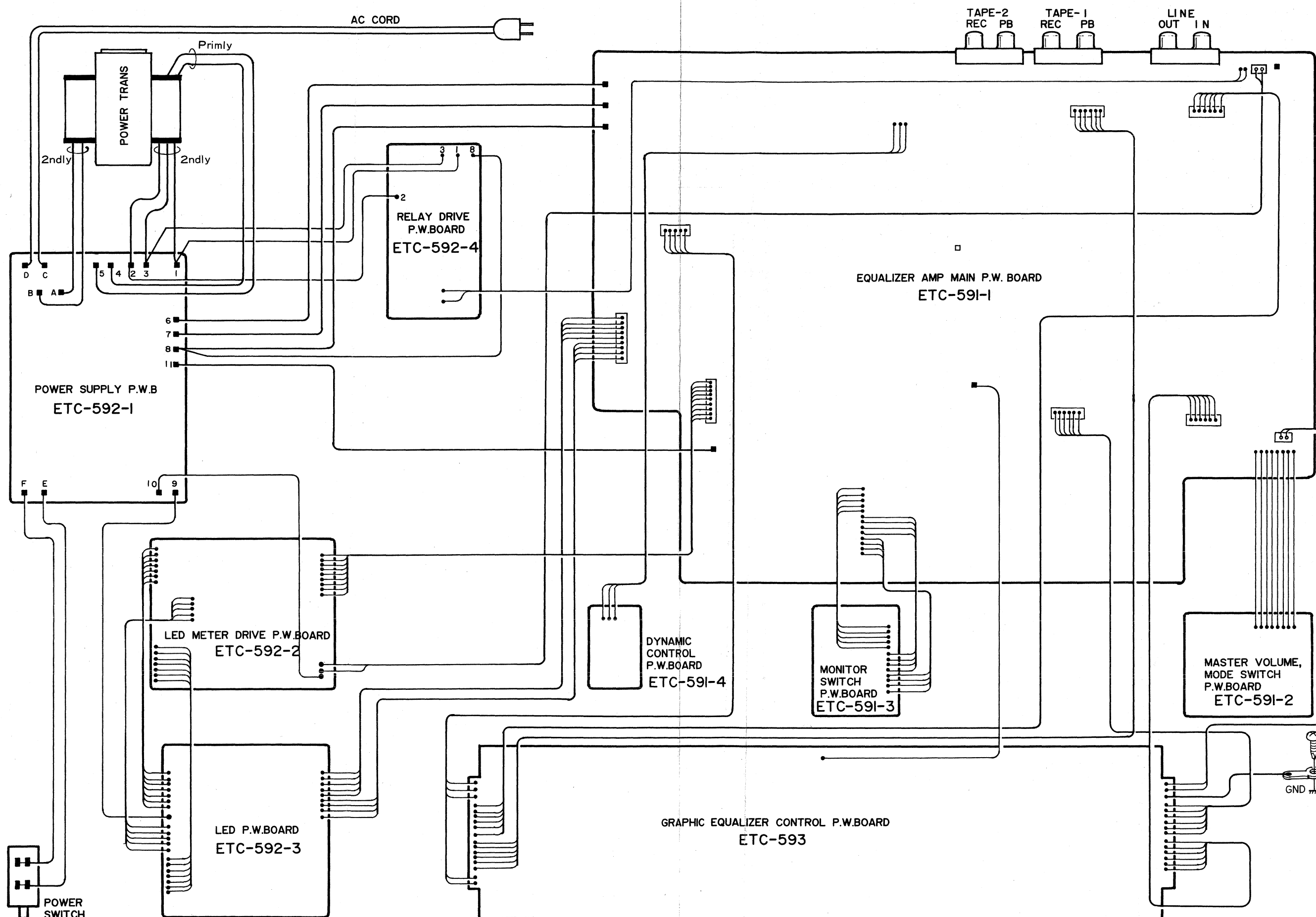
ETC0593 VOLUME UNIT PARTS LIST

Ref. No.	Part No.	Part Name & Descriptions	
C321 ~322	2544146004	1μF	50V ELECTROLYTIC
C325 ~326	2544146004	1μF	50V ELECTROLYTIC
C331 ~332	2544140000	4.7μF	35V ELECTROLYTIC
C401 ~402	2544146004	1μF	50V ELECTROLYTIC
C405 ~406	2544140000	4.7μF	35V ELECTROLYTIC
C407 ~408	2544146003	1μF	50V ELECTROLYTIC
C411 ~412	2544130007	100μF	10V ELECTROLYTIC
C415 ~416	2544133004	22μF	16V ELECTROLYTIC
C419 ~420	2544132005	10μF	16V ELECTROLYTIC
C701 ~702	2544024003	4.7μF	25V ELECTROLYTIC
C703	2544134003	33μF	16V ELECTROLYTIC
C704	2544132005	10μF	16V ELECTROLYTIC
SWITCH			
SW01	2124440007	4P PUSH SWITCH	INPUT SEL.
SW02	2124438006	3P PUSH SWITCH	REC MODE
SW03	2124439005	3P PUSH SWITCH	EQ. MODE
SW04 ~05	2124437007	ROTARY SWITCH	
OTHER PARTS			
RL01	2220927107	P.W. BOARD	
	2090047903	0.6 JUMPER WIRE	USED 103
	2050134908	TERMINAL PIN	USED 7
	2050141001	COMMON PLATE	USED 3
	2140036000	REEL RELAY	
	2090008104	JUMPER P=15mm	USED 25
	2090008162	JUMPER P=20mm	USED 7
	4170204017	RADIATOR 20mm	USED 2
	2090008120	JUMPER	USED 1
	2036084001	4P CONNECTOR BASE	USED 3
	4730454016	TAPPING SCREW(2)4x8	USED 4
	2050133051	5P NH CONNECTOR BASE	
	2050133022	2P NH CONNECTOR BASE	USED 2
	2050133093	9P NH CONNECTOR BASE	
	2050133077	7P NH CONNECTOR BASE	
	2050133064	6P NH CONNECTOR BASE	USED 4
	2042055008	8P CONNECTOR CORD	
	2042055011	8P CONNECTOR CORD	
	2046019008	13P CONNECTOR CORD	

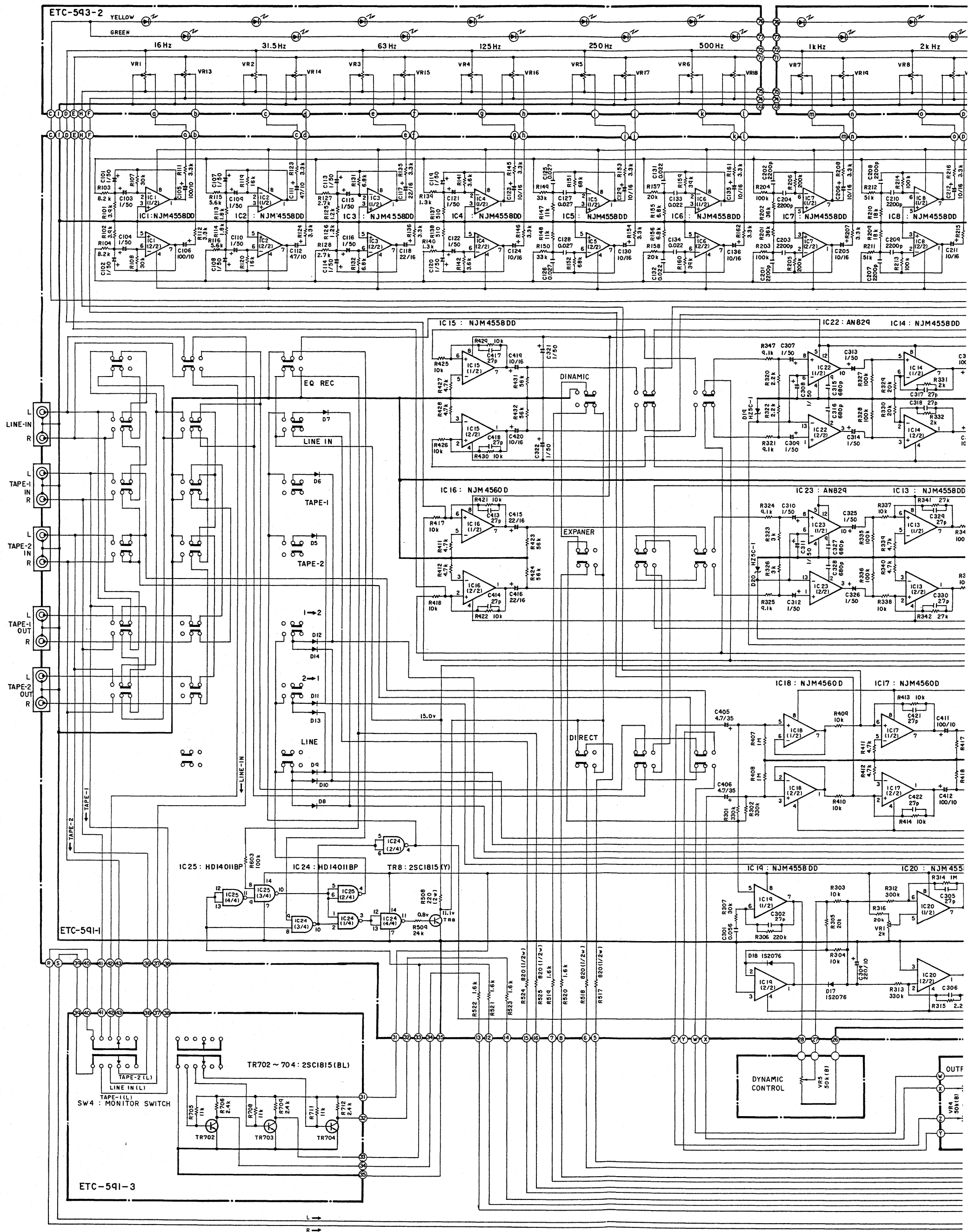
Ref. No.	Part No.	Part Name & Descriptions	
VOLUME			
VR01 ~012	2110371106	SLIDE VOLUME	(GREEN)
VR013 ~024	2110371119	SLIDE VOLUME	(YELLOW)
OTHER PARTS			
	2220929008	P.W. BOARD	
	2090047903	0.6 JUMPER WIRE	USED 35
	2050134908	TERMINAL PIN	USED 4
	4121297002	VOLUME BRACKET	
	4711301036	PAN SCREW 3x4	(BLACK)
	2032108033	2P CONNECTOR CORD	
	2038109053	5P CONNECTOR CORD	
	2040091022	6P CONNECTOR CORD	USED 2
	2040091035	6P CONNECTOR CORD	
	2040091006	6P CONNECTOR CORD	
	2030226075	1P CONTACT ASS'Y	

CONNECTION DIAGRAM

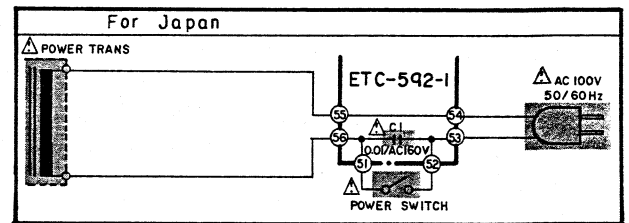
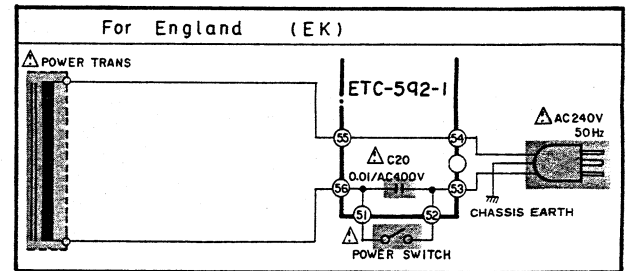
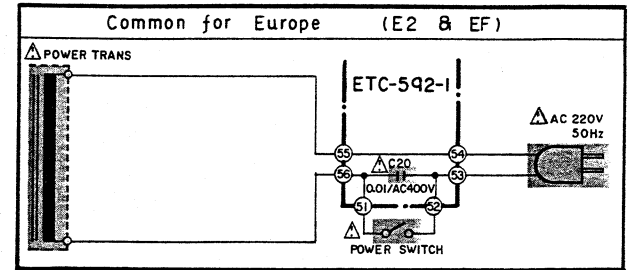
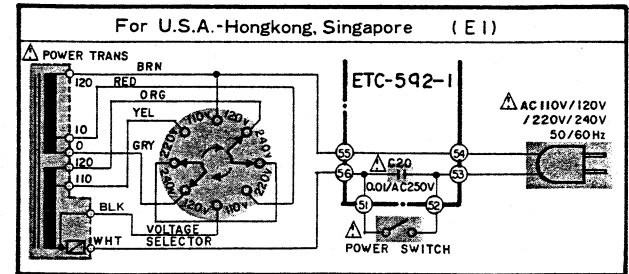
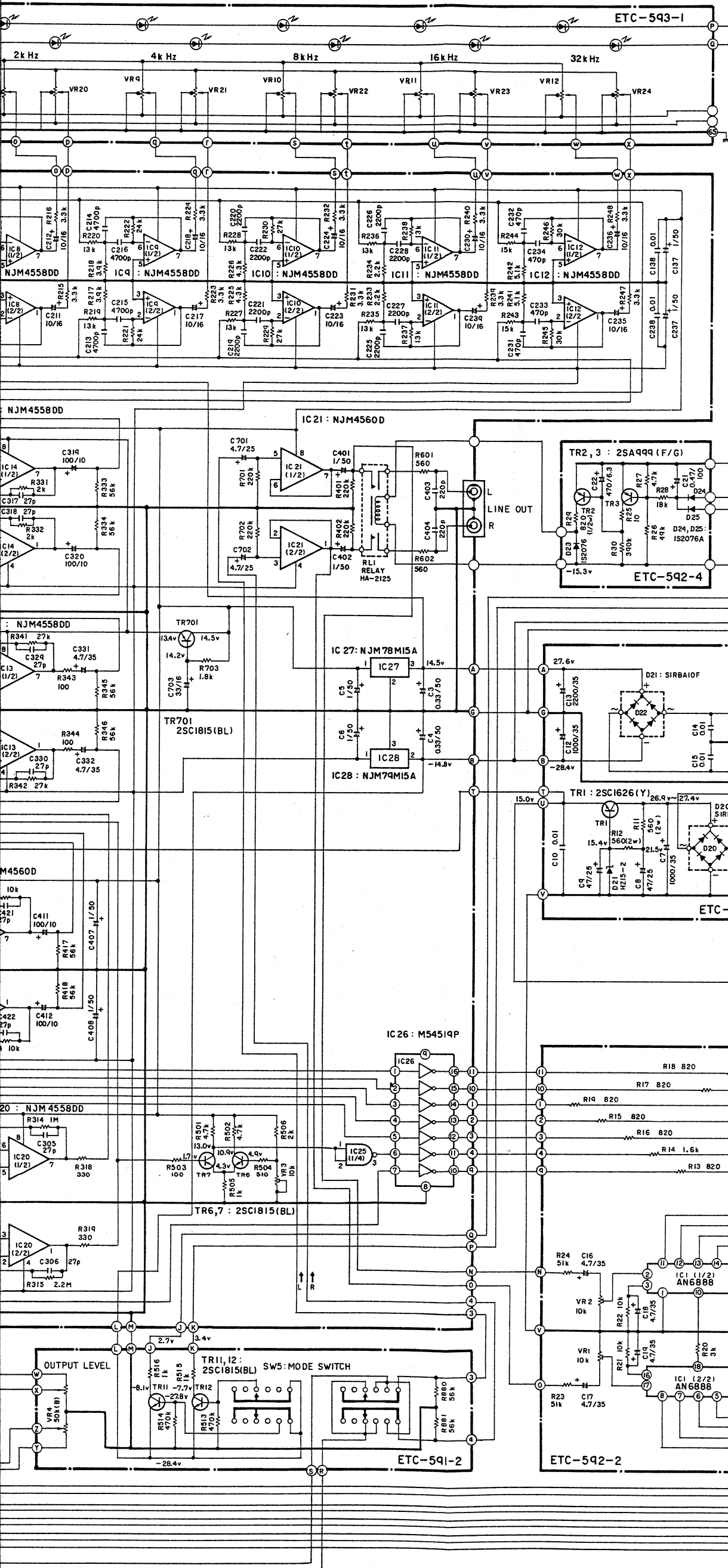
This connection diagram is prepared based on E2.



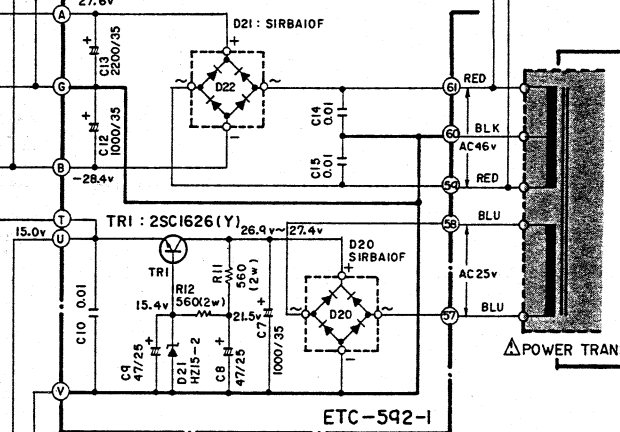
WIRING DIAGRAM



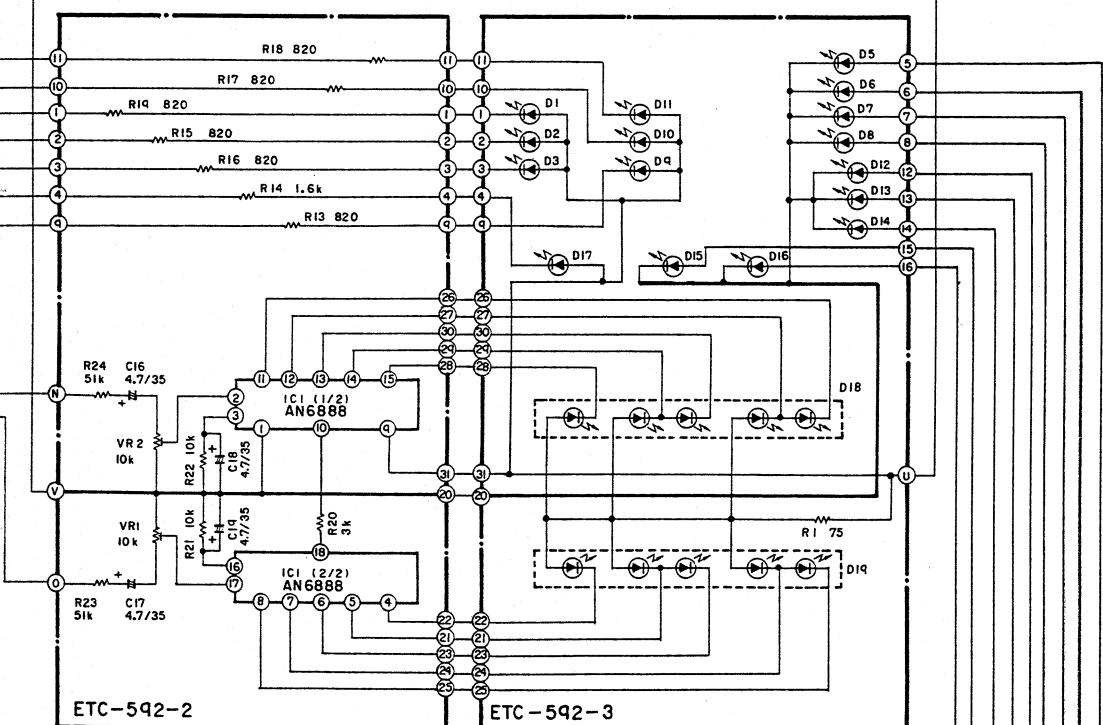
⚠ Means important safety item, which must be replaced, when necessary, by a part specified or meeting the specification by the manufacture.



Depending on the area, this circuit diagram varies as shown in the figure below.



D1, 2, 3, 4, 10, 11, 18, 19 : GREEN
D7, 8, 12, 13, 14, 17 : RED
D6, 15, 16 : YELLOW

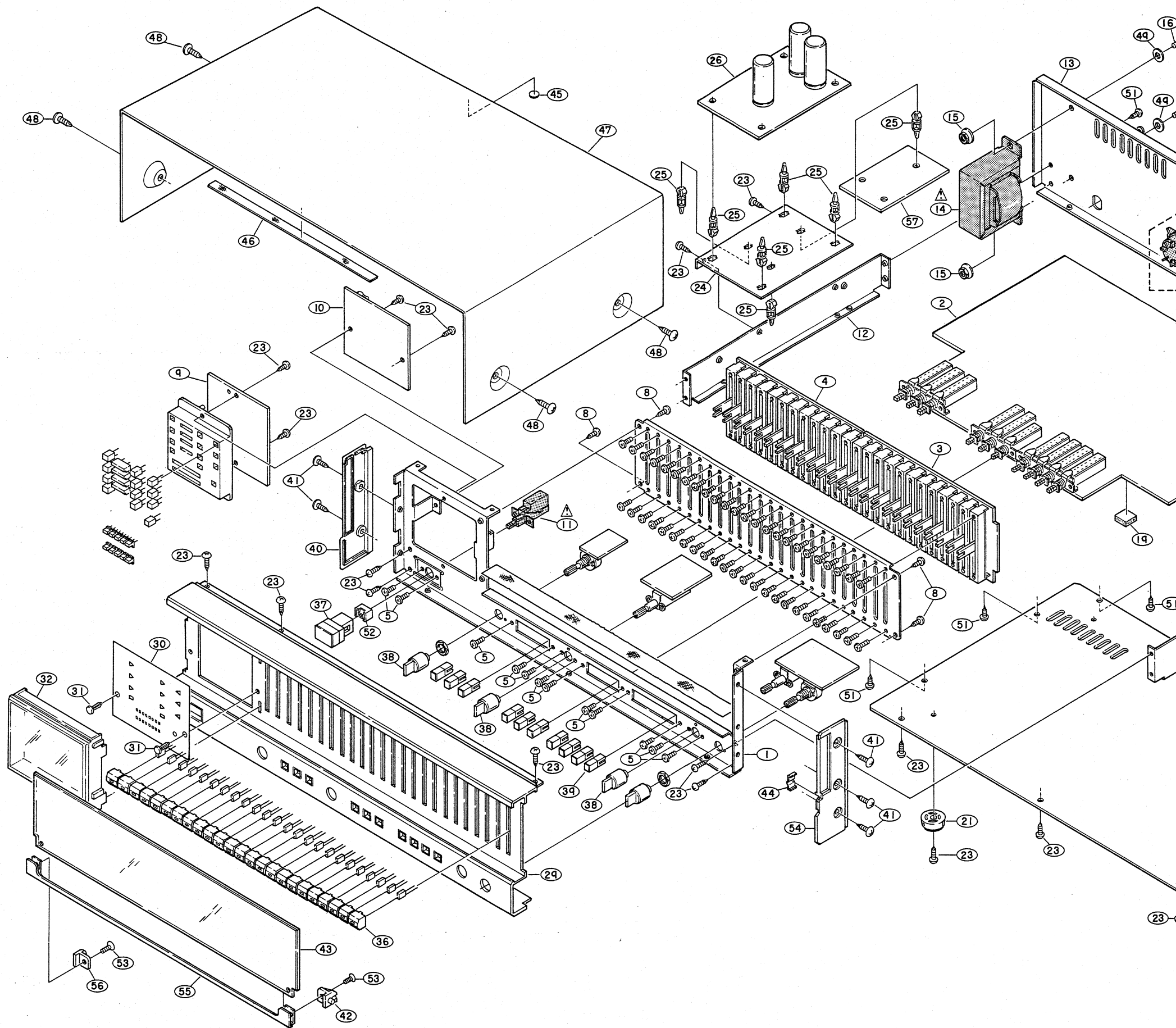


NOTES

ALL RESISTANCE VALUES IN OHM K = 1,000 OHM = 1,000 OHM
ALL CAPACITANCE VALUES IN MICRO FARAD P = MICRO-MICRO FARAD
EACH VOLTAGE AND CURRENT ARE MEASURED AT NO SIGNAL INPUT CONDITION.
CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

EXPLODED VIEW OF CHASSIS AND CABINET

1. Measure when necessary by the manufacturer.
2. This EXPLODED VIEW shows the relative positions of the parts.



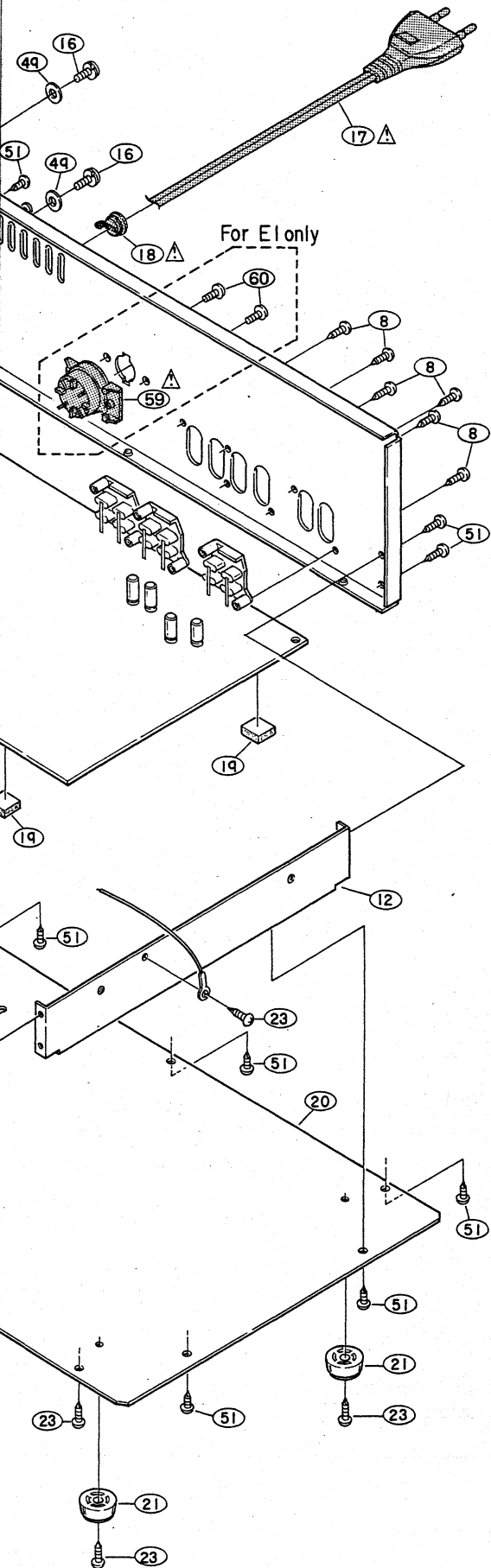
- Notes: 1. See addendum list below for the parts with asterisk (*) on the Ref. No. and the other parts not included in the list.
2. * mark is not included EXPLODED VIEW.
3. This list is prepared based on E2.

EXPLODED VIEW PARTS LIST

Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description
1	4121296003	FRONT CHASSIS	19	4610121029	CUSHION	38	1120426000	KNOB ASS'Y	5		
2	ETC0591	EQ. UNIT	20	1050540108	BOTTOM COVER	39	1130417009	PUSH KNOB	5		
3	ETC0592-3	P.W.B UNIT (R)	21	1048001002	FOOT	40	1460590007	SIDE PLATE (L)	5		
4	ETC0592-4	P.W.B UNIT (L)	22	4140311008	BLIND PLATE	41	4770052025	FIX. SCREW	6		
5	4711303018	PAN SCREW 3x6	23	4730354019	TAPPING SCREW(2)3x8	42	4010104002	HINGE (R)	6		
6	—	NUT M7	24	4121299107	BRACKET	43	1460592102	DOOR	6		
7	ETC0593	VOLUME UNIT	25	MD-5271	P.C.B SUPPORT	44	4630347003	SPRING	6		
8	4730354035	TAPPING SCREW(2)3x8 (BLACK)	26	—	—	45	1040034006	STOPPER	6		
9	ETC0623-1	DISPLAY/P SPP. UNIT (LED)	27	—	—	46	1220069008	SPACER	6		
10	ETC0623-2	DISPLAY/P SPP. UNIT (IC)	28	4450033005	WIRE CLAMP BAND (USED 8)	47	1020168109	TOP COVER	6		
11	2129136015	POWER SWITCH	29	1441101004	FRONT PANEL	48	4734801005	TAPPING SCREW 4x8 (NI)	6		
12	4121298108	SIDE CHASSIS	30	1460583001	INSIDE PLATE	49	4751005017	WASHER ϕ (BLACK)	6		
13	1050539216	BACK PANEL	31	4770096007	PUSH RIVET	50	—	—	6		
14	2335417007	POWER TRANS.	32	1460584107	FRONT COVER	51	4730353036	TAPPING SCREW(2)3x6 (BLACK)	6		
15	SC-1050H	NUT	33	1460585009	KNOB GUIDE (A)	52	1140056007	FLEXIBLE RING	6		
16	4700040007	PAN SCREW WITH S. WASHER 4x10 (BLACK)	34	1460586008	KNOB GUIDE (B)	53	4712801014	FLAT HEAD SCREW 3x5 (BLACK)	6		
17	2062002031	AC CORD	35	1460587007	KNOB GUIDE (C)	54	1460589209	SIDE PLATE (R)	6		
18	4450020005	CORD BUSH	36	1130443109	SLIDE KNOB ASS'Y	55	1441125006	DOOR ESC. BAR	6		
			37	1130444001	PUSH KNOB ASS'Y	56	4010103003	HINGE (L)	6		

▲ Means important safety item, which must be replaced, when necessary, by a part specified or meeting the specification by the manufacture.

This EXPLODED VIEW is prepared based on E2.



WARNING:

- 1. Component parts**
Parts marked with ▲ and/or shading in this service manual have special characteristics important to safety. Be sure to use the specified parts for replacement.
- 2. Leakage current**
Before returning the appliance to customer, test the leakage current when the power plug is connected. Use a calibrated (with an error of not more than 5%) leakage current tester and measure the leakage current from any exposed metal to the earth ground. Reverse the power plug polarity and test the above again.
Any current measured MUST NO EXCEED 0.5 milliamps. Corrective measure must be taken if it exceeds the limit.

NIPPON COLUMBIA CO., LTD.
No. 14-14, 4-CHOME AKASAKA,
MINATO-KU, TOKYO 107 JAPAN
TEL: 03-584-8111
TLX: JAPANOLA J22591
CABLE: NIPPONCOLUMBIA TOKYO

Printed in Japan

ADDENDUM LIST

Ref. No.	Part Name	Part No.			
		E3 for U.S.A.	EK for U.K.		E1 for Hong Kong & Singapore
▲ 13	POWER SWITCH	2P11	2P11	2P11	2P11
13	BACK PANEL	105	105	105	1050562005
▲ 14	POWER TRANS	2335	2335	2335	2335422003
▲ 17	AC CORD	20	20	20	2006031026
▲ 18	CORD BUSH	4	4	4	4450028007
28	WIRE CLAMP BAND	4450033005	4450033005	4450033005	4450033005 (USED 9)
▲ 59	VOLUME SELECT SW				2120186006
60	PAN SCREW 3x6 (BLACK)				4711303034 (USED 2)
61	PRESET LABEL				5150290008
PACKING & ACCESSORIES					
c	CARTON CASE	501	501	501	5010924003
g	WARRANTY IN ENVELOPE	—	—	—	5158053001

Ref. No.	Part No.	Part Name & Description
57	4630347003	SPRING WASHER φ4
58	4751005017	
59		
60		
61		
62		
63		
64		
65		
66		
67		
PACKING & ACCESSOIRES (not included EXPLODED VIEW)		
a.	5040052013	CABINET COVER
b.	5030380009	CUSHION
* c.	5010849023	CARTON CASE
d.	2032101001	2P CONNECTOR CORD (USED 2)
e.	5050061007	ENVELOPE
f.	5111136004	INST. MANUAL